

REMARKS

The Official Action mailed November 7, 2005, and the Advisory Action mailed February 28, 2006, have been received and their contents carefully noted. This response supplements the *After Final Response* filed February 7, 2006. A *Notice of Appeal* was filed May 7, 2006. Filed concurrently herewith is a *Request for Continued Examination*, which requests entry of the *After Final Response*. This response is filed within two months of the mailing date of the *Notice of Appeal* and therefore is believed to be timely without extension of time. Accordingly, the Applicant respectfully submits that this response is being timely filed.

The Applicant notes with appreciation the consideration of the Information Disclosure Statements filed on June 29, 2001; December 19, 2001; April 26, 2002; July 5, 2002; July 16, 2002; September 22, 2003 (corrected April 15, 2005); February 17, 2004; March 31, 2004; October 7, 2004; and September 2, 2005.

Claims 1-17, 19-30 and 47-58 were pending in the present application prior to the above amendment. Claims 1-14, 19-24 and 47-52 have been amended to clarify the features of the present invention, and new claims 59-64 have been added to recite additional protection to which the Applicant is entitled. Accordingly, claims 1-17, 19-30 and 47-64 are now pending in the present application, of which claims 1-12, 19, 20, 47, 48 and 59 are independent. For the reasons set forth in detail below, all claims are believed to be in condition for allowance. Favorable reconsideration is requested.

The Advisory Action appears to maintain the rejection at paragraphs 2-5 of the Official Action dated November 7, 2005, which reject claims 1-17, 19-30 and 47-58 as obvious based on the combination of JP 07-038113 to Morosawa and U.S. Patent No. 5,648,276 to Hara et al., either alone or in combination with one or more of JP 09-186336 to Kudo et al. and U.S. Patent No. 5,608,232 to Yamazaki et al. The Applicants respectfully traverse the rejection because the Official Action has not made a *prima facie* case of obviousness.

As stated in MPEP §§ 2142-2143.01, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Initially, the Applicant respectfully requests that the detailed arguments presented in the *After Final Response* filed February 7, 2006, be incorporated herein by reference.

The prior art, either alone or in combination, does not teach or suggest all the features of the independent claims, as amended. Independent claims 1-12, 19, 20, 47 and 48 have been amended to recite removing a natural oxidation or oxide film formed on a surface of a crystallized semiconductor film by etching after irradiation of a laser light; and leveling a surface of the crystallized semiconductor film by recrystallizing the crystallized semiconductor film after removing the natural oxidation or oxide film. The Applicant respectfully submits that Morosawa, Hara, Kudo and Yamazaki '232, either alone or in combination, do not teach or suggest the above-referenced features of the present invention.

Also, as described in detail in the *After Final Response* filed February 7, 2006, the Official Action concedes that Morosawa does not teach or suggest recrystallizing a semiconductor film in order to level a semiconductor film after a native oxide removal process. Hara does not cure the deficiencies in Morosawa. Although Hara teaches that melting-recrystallization is caused by irradiation of a laser beam for crystallizing an a-Si:H:P thin film 2 and an a-Si:H thin film 3, *i.e.* recrystallization by laser irradiation, Hara does not teach or suggest leveling a surface of a semiconductor film by recrystallizing a semiconductor film after irradiation of a laser light and removal of an oxide film. Specifically, the Official Action has not instantly and unquestionably demonstrated that one of ordinary skill in the art at the time of the present invention would have recognized that Hara's melting-recrystallization step would necessarily result in the leveling of a semiconductor film, much less that such step should occur after removal of an oxide film.

As noted in previous responses, Kudo and Yamazaki '232 do not cure the above-referenced deficiencies in Morosawa and Hara.

Since Morosawa, Hara, Kudo and Yamazaki '232 do not teach or suggest all the claim limitations, a *prima facie* case of obviousness cannot be maintained.

Furthermore, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify Morosawa, Hara, Kudo and Yamazaki '232 or to combine reference teachings to achieve the claimed invention. MPEP § 2142 states that the examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. It is respectfully submitted that the Official Action has failed to carry this burden. While the Official Action relies on various teachings of the cited prior art to disclose aspects of the claimed invention and asserts that these aspects could be used together, it is submitted that the Official Action does not adequately set forth why one of skill in the art would combine the references to achieve the features of the present invention.

The test for obviousness is not whether the references “could have been” combined or modified as asserted in the Official Action, but rather whether the references should have been. As noted in MPEP § 2143.01, “The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990) (emphasis in original). Thus, it is respectfully submitted that the standard set forth in the Official Action is improper to support a finding of *prima facie* obviousness.

The Official Action has not demonstrated sufficient motivation in the prior art to suggest that Hara’s melting-recrystallization step should occur after removal of the natural oxide film 8 in Morosawa (see, for example, Figures 4(A) and 4(B) of Morosawa).

In the Advisory Action dated February 28, 2006, the Official Action asserts that “recrystallizing for the semiconductor film by irradiation of a laser light in order to avoid such problem as disclosed Hara et al. does not teach away the disclosure of Morosawa it rather supports Morosawa quest avoiding of the dangling bond” and that “recrystallizing the semiconductor film (i.e., the silicon thin film) after cleaning (i.e., the cleaning process that removed native oxide layer as suggested by Morosawa and the clean surface that suggested by Hara et al.) in presence of hydrogen atom is beneficial to avoid formation of dangling bond thereby forming the semiconductor film having good uniformity and high reliability” (page 4, Paper No. 20060221). Although these general statements appear to describe a hypothetical advantage to various features of the prior art, the Official Action still has not demonstrated why one having ordinary skill in the art at the time of the present invention would have necessarily applied Hara’s melting-recrystallization step after removal of the natural oxide film 8 in Morosawa.

First, Hara’s melting-recrystallization step changes the a-Si:H, P thin film 2 and the a-Si:H thin film 3 into a polycrystalline Si thin film 4 (column 8, lines 7-11). Hara merely discloses laser irradiation to an a-Si thin film, not a crystallized semiconductor

film (please note that the amended claims recite a crystallized semiconductor film with respect to this step). Thus, the Applicant respectfully submits that Morosawa and Hara, either alone or in combination, do not teach or suggest leveling a surface of a crystallized semiconductor film by recrystallizing the crystallized semiconductor film after irradiation of a laser light and removal of an oxide film, as recited in the present independent claims.

Second, even if the teachings of Morosawa are combined with Hara's melting-recrystallization step, the Applicant respectfully submits that the Official Action still needs to demonstrate that the poly-silicon thin film 6, which was already irradiated with an excimer laser in Morosawa (see, paragraph [0009]) should once again be applied to Hara's melting-recrystallization step, which merely changes an a-Si thin film into a p-Si thin film. Also, it is not clear how these steps relate to the asserted motivation, i.e. in order to form a "semiconductor film having good uniformity and high reliability" (Id.).

Further, it is not sufficient to merely point out the advantages of two references and assert that it would have been obvious to combine the two references so that you can have both advantages in one device. Rather, in order to form a *prima facie* case of obviousness, the Official Action must show why the references should have been combined.

Therefore, the Applicant respectfully submits that the Official Action has not provided a proper or sufficient suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify Morosawa, Hara, Kudo and Yamazaki '232 or to combine reference teachings to achieve the claimed invention.

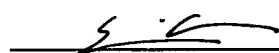
In the present application, it is respectfully submitted that the prior art of record, either alone or in combination, does not expressly or impliedly suggest the claimed invention and the Official Action has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

For the reasons stated above, the Official Action has not formed a proper *prima facie* case of obviousness. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

New claims 59-64 have been added to recite additional protection to which the Applicant is entitled. Specifically, independent claim 59 recites “forming a gate insulating film over the crystallized semiconductor film after the leveling step; and forming an impurity region in the crystallized semiconductor film after forming the gate insulating film.” Morosawa appears to disclose that ions such as a phosphorus ion or a boron ion are implanted into the source/drain formation region 3a of the amorphous silicon thin film 3 using photo resist film 4 as a mask to form an ion-implanted region 5 before the laser irradiation step, and a gate insulating film 9 is formed after removing a natural oxidation film (paragraphs [0008]-[0011]; Figures 2-6). Hara appears to disclose that the P atoms contained in the a-Si:H,P thin film 2 are doped into selective portions of the polycrystalline Si thin film 4 such that a source region 5 and a drain region 6 of an n⁺-type are formed before a gate insulating film 7 (column 8, lines 11-26; column 9, lines 21-32). Therefore, the Applicant respectfully submits that Morosawa and Hara do not teach or suggest forming a gate insulating film after a leveling step and forming an impurity region after forming the gate insulating film. For the reasons stated above and already of record, the Applicant respectfully submits that new claims 59-64 are in condition for allowance.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,


Eric J. Robinson
Reg. No. 38,285

Robinson Intellectual Property Law Office, P.C.
PMB 955
21010 Southbank Street
Potomac Falls, Virginia 20165
(571) 434-6789